

of America

Good Reading about Automobiles, Motors and Cycles, and the People who Make and Use Them

VOL. I

NEW SERIES

No. 13

MOTOR AGE

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CHICAGO, MARCH 27, 1902

Columbia Automobiles

ELECTRIC

IN SEVENTH YEAR OF
SUCCESSFUL SERVICE

GASOLINE



Columbia Mark XXXI Runabout

This is our latest Runabout. Built on the successful lines of Gasoline Carriage construction. It has a double motor equipment, long wheel base, and the battery is divided so that the weight is equalized on both front and rear axles. Its radius on each charge is forty miles, and its maximum

SPEED, 13 MILES PER HOUR

WRITE FOR 1902 ILLUSTRATED CATALOGUE AND PRICE LIST

Electric Vehicle Co., Hartford, Conn.

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The Motor Age

A budget of good reading about Automobiles, Motors and Bicycles, and the people who make and use them. *

TO MANUFACTURE PANHARDS IN UNITED STATES

NEW YORK, March 24.—Gustave Clement, president of the Panhard-Levassier Co., will sail for France tomorrow on the William der Grosse after having completed all the arrangements for the establishment of a factory in this country for the manufacture of the famous Panhard machines. The American machine will be produced by a company backed entirely by French capital, notwithstanding the fact that M. Clement received offers from Americans for over \$3,000,000 worth of stock. The machines placed on the market this year will be built from parts imported from the other side, but the company expects to be able to make its next season's model entirely in this country.

The new company will, at least during the first 6 months of its existence, be under the personal management of Mr. Clement, who will be assisted by heads of departments brought from the French factory. There will be no attempt to build vehicles for exportation abroad, as it is expected the demands here will be more than the new factory can produce for some time.

Mr. Clement says that his old company has orders on its books for over \$1,000,000 worth of vehicles, and that last year the company declared a dividend of 35 per cent.

The new Charron, Girardot & Voight Co., which was incorporated in New York a few weeks ago, and which will probably establish a factory at Rome, N. Y., will not make Panhards, as was reported, but will produce a vehicle which has proved a favorite in France. This company has for years been the selling agent for the Panhard machine, Mr. Charron using it in all his

races, and this led to the erroneous belief that the new company would make Panhards.

Although no mention was made of the matter at the time, there were, among other visitors to the Chicago show, two foreign visitors, one of whom enjoys international fame. They were A. Clement, whose reputa-

tion as a cycle builder was once world-wide and who is now interested in the Panhard factory, and E. R. Lucas. They came to America about a month ago and have visited large factories where machine tools are made in New York, Chicago, Cincinnati and Cleveland. They were in Hartford last week and spoke in high terms of American-made machinery. Mr. Clement has made use of it for many years in his great factory in Paris and came over this time for the purpose of seeing for himself the country and the place in which the tools used by him are made. Mr. Lucas accompanied him as business associate, personal friend and interpreter, for the president of the Panhard-Levassier works, al-

M. Gustave Clement



though he read and wrote English well before coming here, was not versed in the speaking of the language. Since coming here, however, with the quickness of the Frenchman, he has sufficiently mastered the language to carry on a conversation with considerable fluency. Accompanied by two American friends, the Frenchmen visited several of the machine shops in Hartford and gave orders for several heavy tools and special machinery which will be shipped to France. Their visit here was largely in the nature of a pleasure trip in which material interests were combined with recreation.

WINTON TALKS OF FUTURE RACES

Believes, as a Manufacturer, That Racing is Valuable—Fourier's Time Will be Eclipsed and Winton, for One, Expects to Beat It.

NEW YORK, March 24.—Alexander Winton was in town today. He leaves for Cleveland tonight. The MOTOR AGE man found him this afternoon lolling in reverie in an automobile at the Winton storage station and lazily puffing a cigar. To have the holder of the world's track records from 1 to 10 miles at one's mercy was too great a temptation to an interview to resist. Mr. Winton was defenceless and gracefully yielded.

"Will you be in the A. C. A. straightaway mile trials on May 31, Mr. Winton?"

"I have the designs for my new racer completed and as this is only March I don't see why I shouldn't have it finished by the end of May. I don't think much of this straightaway racing, though."

"And why not?"

"It is not a test for the driver. It is simply a case of pull her wide open and let her go. Whoever has the most nerve and the fastest machine will win. There is no skill or finesse needed, such as is required in rounding the curves of a track. This track racing isn't so bad. One doesn't begin to skid at the curves, if he knows how to handle his machine, until he gets below a 1:08 gait. The new racers will have more speed than their drivers will dare get out of them."

"How fast will they go the straightaway mile?"

"I'm not good at guessing and wouldn't dare say."

"Will they beat Fourier's 51 4-5 seconds?"

"Indeed they will."

"Go below fifty?"

"Yes. Way below."

"Will you race Fourier?"

"I'm not a racing man and will only make time trials as a manufacturer to show my goods."

"You make a pretty good bluff at being a racing man when one considers the records you hold."

"I am a racing man so far as they go."

His eye lit up with a proud gleam and he continued defiantly:

"And I'm going to keep them. And when any one beats them I'm going to keep trying until I get them back."

"You are going to race at Springfield, ain't you?"

The MOTOR AGE man told him about trains, boats and distances, and he then didn't see why he couldn't ride a time trial on the Hampden Park banked track on May 30, and reach New York in time for the straightaway mile trials on May 31.

"You think racing a good advertisement for a vehicle, don't you, Mr. Winton?"

"Indeed I do. Besides the advertisement, though, there's a lot a man learns by racing his vehicle he can learn in no other way. To show you how much value I set on time trials let me tell you we are going to have a half mile or a three-quarter mile track built at our

factory just to test our vehicles. We can then guarantee just the speed, of which they are capable."

There will evidently be something doing with that new racing machine of Alexander Winton's.

Winton Company Will Build Giant Factory

Cleveland, March 25.—The Winton Motor Carriage Co. has made announcement that it is preparing plans for what it claims will be the largest automobile factory building in the country. A site of twelve acres has been purchased on the west side of the city, adjoining the National Carbon Works, and facing the L. S. & M. S. railway tracks. The plant will be in one building, nearly 900 feet in length and one story high. Gasoline engines will be used for the propulsion of the machinery. Surrounding the building will be a two-third mile track, banked for high speed, and broad enough that there may be sandy places for testing machines.

Mr. Winton is doing all his own designing and the plant will be equipped with much special machinery suitable for the company's product. It is announced that the plant will give employment to 1,000 men, compared with 250 at present, and the output will be increased proportionately.

The company has recently increased its capital stock to \$1,000,000 with a view to these improvements. The change is made necessary because of the overwhelming demand for vehicles, specially touring cars, and because the company was unable to secure sufficient additional space in the plant which it occupies. Work will start at once and it is the intention to have the buildings completed this summer.

Sipe & Sigler, manufacturers of the Willard storage battery, have been succeeded by the Willard Storage Battery Company. The company will pay especial attention to electric vehicle batteries in the future.

The F. B. Stearns Co. is also expanding. Work has been started on an addition which will more than double the output. The new building will be used for finishing, woodworking and blacksmith departments, while the present shop will be devoted to machine work exclusively.

Theodore Kundtz, formerly well known as a manufacturer of wood rims, is preparing to make automobile bodies. During the past year he has built all of the bodies used by the White Sewing Machine Co. His immense cabinet working plant is well equipped for this work.

The American Automobile Mfg. Co. has located a factory on East Prospect street, where it is preparing to manufacture electric and gasoline vehicles.

The Geneva Automobile & Mfg. Co. has brought out a new touring car model. It is of French pattern and built for fast work.

H. A. Githens has been in the city the past week and took a number of good orders for G & J automobile tires.

New York Notes and Comment

New York, March 24.—Stops on account of tire troubles have caused much discussion as to the provisions made for them in the rules of the coming 100

miles endurance runs. On the theory that tires are mere outside equipments for which makers should not be held responsible in such tests of motor vehicles as these the A. C. A. includes stops for tire repairs altogether among the non-penalized stops. The L. I. A. C. committee, however, has come to the conclusion that since makers have a choice of tires they should to some extent be made responsible for them in the coming test. Accordingly the following amendment to the rules governing the L. I. A. C. endurance run on April 26 in this particular has been announced:

Under non-penalized stops are included those stops due to tire troubles, under the following restrictions: (a) Tires are to receive no attention until they shall have become deflated and it is apparent that further running in that condition shall prove destructive to either the car or tire, and (b) one hour shall be allowed as non-penalized time for such repairs; any time consumed in excess of 30 minutes during the entire run shall be subject to full penalty.

* * *

Henri Fournier has sailed for Europe to prepare for his foreign racing engagements. The first of these is the Gordon Bennett international cup race from Paris to Bordeaux on April 20. He is the first choice of France and will ride a Mors. De Kuyff (Panhard) is second, and Girardot (Charron-Girardot-Voigt) is third. Fournier will also ride a Mors in the Paris-Vienna race on June 15. "Between races," said he to a MOTOR AGE man, "I shall devote my time to road tests of the six new Mors models. I shall return in July. I shall ride no mile races. If Ford, Cooper and the others wish to race me they will have to make their matches for the road at a distance not less than one hundred miles. A mile is no test of a vehicle. One may be made to be very fast for that distance that could not keep up the pace or sustain the power for a 100-mile journey." Fournier is enthusiastic on automobile prospects in Chicago and his reception by the Chicagoans.

* * *

A press dispatch from New Haven to the Herald on Friday says: Henry G. Odyke, of Odyke & Thompson, civil engineers, New York, spent the day in Southington, Conn., as an agent of the Automobile Club of America authorized to find a level stretch of road 2½ or 3 miles long for speeding and racing purposes. The automobileists, being debarred from New York, are looking for a suitable place not far away. The road which Mr. Odyke considers best adapted to automobile racing is Queen street, between Southington and Plainville, Conn. It could probably be leased by arrangement with the town authorities and abutting property owners.

* * *

New provisions have also been made by the L. I. A. C. for stops for recharging or relaying batteries in the electric class. They are as follows:

Electric vehicles are to be allowed a total of 60 minutes for either recharging or relaying batteries. Any time in excess of a total of 60 minutes during the entire run will be subject to full penalty.

PARIS-VIENNA RACE DECLARED OFF

Bavarian Government Refuses to Allow Racing Through Its Domain—Americans Will Now Compete at Home—Fournier Has Sailed

NEW YORK, March 24.—The Paris-Vienna race is off, if the information received by Albert C. Bostwick, who entered the race, from a friend in Paris, be correct.

"The reason for abandoning it," said Mr. Bostwick to a MOTOR AGE man this morning, "is the refusal of the Bavarian authorities to permit the races to cross their territory."

M. Cuenod, vice president of the Automobile Club of Switzerland and a member of the Paris-Vienna race committee, now at the Waldorf-Astoria, was much astonished when told the news by another MOTOR AGE man. He said he had heard nothing of any such trouble.

Fournier could not be found at the Café Martin, his usual haunt for dinner, this evening.

It certainly seems strange that if Mr. Bostwick's information be correct there should have been no cable sent of the news and no mention made of it by the foreign correspondents of American trade journals.

Mr. Bostwick, however, is close to the foreign racing authorities and his informant may have had inside information of what was to happen.

I shall now compete in our club's straightaway mile trials," said Mr. Bostwick. "I shall probably drive one of our Pan-American standard models. We have employed an engineer to survey and report upon available courses, but we cannot say yet when the trials will be held. Whether in Connecticut, New York or New Jersey, or on Long Island. We hope to run them near this city, however."

Two Celebrities Have Sailed

New York, March 25.—(Special telegram.)—Henry Fournier and Major Taylor sailed for Europe on the Kaiser Wilhelm der Grosse today. The former goes to defend his laurels as the French representative in the Gordon Bennett international cup race and the latter to endeavor to repeat his extraordinary successes on the cycle path. It is reported that the Paris-Vienna race has been abandoned.

The Next Show in New York

The following notice has been issued by the secretary of the Automobile Club of America:

The next automobile show in the city of New York will be held during the third week in January, 1903, at Madison Square Garden. It will be given under the auspices of the Automobile Club of America and the National Association of Automobile Manufacturers, and the management will be jointly in the hands of the Madison Square Garden Co., the National Association of Automobile Manufacturers and the Automobile Club of America.

DENVER DEALERS DEFY OPPOSITION

Became Enthused Over Chicago Show and Will Hold One of Their Own—San Francisco Show to Follow

DENVER, Col., March, 20.—Denver and San Francisco are to have automobile shows and George Wahlgreen, of this city, is to manage them.

The show for Denver is scheduled for May. During the Chicago show a number of dealers met in the main alley of the exhibition hall and resolved that Denver should have something in the same line. When they returned to this city the ten dealers in machines were called into conference, all but one agreeing to assist in every manner possible. The one dealer who has declined to go in may reconsider and join the other nine. The exact date for the show has not been set, the dealers being in communication with the owners of available halls to determine when will be the most convenient date.

The local dealers who attended the Chicago show have been dropping home during the past week, all enthusiastic over the exhibition and over the possible chance for racing during the summer. George Hannan was among those who were at the exhibition. "You have no idea," he said, "of the interest that centered in the show. Lots of the old bicycle push were there, the same faces that we used to see at all the cycle shows. They came down in droves to see the new ways of going about.

"The newspaper men who were in the show claimed that \$700,000 worth of autos were sold on the floor to dealers from other cities. I know that \$100,000 worth of the machines were sold for delivery in Denver, so this city bought one-seventh of the whole lot. The season looks to me as though it was going to be a good one for the business.

"There were many Colorado people at the show. All the Denver dealers, except one, were on hand, and all were talking business from the first. J. S. Seymour, of Steamboat Springs, was one of the out-of-town visitors. D. W. Brunton, Bryan Haywood, A. D. Wilson, Webb Jay, J. S. Patterson and a number of other Denver people. I think we should be able to attract a pretty good crowd to a show of horseless wagons in this town."

To Assemble French Machines Here

New York, March 24.—Ernest Cuenod, the vice-president of the Automobile Club of Switzerland, and one of the founders of the Automobile Club of France, expects before he leaves this country some weeks hence to bring about, as he expresses it with characteristic French eloquence, a marriage between the automobile industries of France and America. M. Cuenod is an important factor in European automobile matters, as will be readily understood when it is stated that he is authorized to dispose of the American patents, rights, secrets, etc., of four of the leading automobile manufacturing firms in Europe and from present indications he will have no trouble in disposing of these rights. Like all Frenchmen, M. Cuenod thinks the French vehicle is su-

preme, but he has the highest admiration for American ingenuity and machinery.

To a *MOTOR AGE* representative who took lunch with him today he said:

"I have been urged for some time to come to America, but have held off until this year because I realized that now your people are thoroughly aroused to the importance of the automobile. France has reached perfection in the automobile and we think America can learn something from us. In automatic machinery and production you are on top. Now by bringing about a marriage of the two the results will be the birth of a machine which will beat the world."

M. Cuenod has made arrangements whereby the four companies he represents will, for the first year, ship the parts of their machines for assembly here. This will enable the American company to fill orders this season and by the time another year comes along the company will be enabled to produce its own machines entire.

M. Cuenod was very happy today over the receipt of a letter from the Automobile Club of France informing him that he had been awarded a grand medal of honor for his work in successfully securing from the French government a measure permitting the vehicles of touring members of any of the international affiliated clubs free entry into France.

Exhibitors At Washington

The management of the Washington show announces that only three spaces now remain and that the following have secured space:

Automobile Storage and Repair Co., Baker and Woods vehicles, charging outfits and supplies.

Buffalo Electric Carriage Co.

Kenneth A. Skinner, DeDion vehicles.

Electric Vehicle Co., Columbia and Riger.

W. C. Koller Carriage Co., Locomobiles.

Chas E. Miller & Bro., Reading.

Schuyler S. Olds, Oldsmobile.

American Darracq Automobile Co.

Friedman Automobile Co., Friedman.

Automobile Co. of America., gasmobile.

National Vehicle Co., National electric.

International Motor Car Co., Waverly electric, Toledo steam and Toledo gasoline.

American Electric Vehicle Co.

U. S. Long Distance Automobile Co.

Porter Battery Co.

Diamond Rubber Co., tires.

Fish Rubber Co., tires.

International A. & V. Tire Co., tires.

Salamandrine Boiler Co., boilers.

Rose Co., Never Out lamps.

John C. Rau, charging plant and electric supplies.

John C. Wood, automobile engines.

Ben E. Dakin, speed regulators and safety locks.

Entries Already Recorded

The labors of the L. I. A. C. committee and members in promoting the success of the test are constant and thorough. No stone is being left unturned to assure

success. Special precautions have been taken to insure against delay or accident at railroad crossings. Engineers will be warned to slacken speed and hold their engines well under control at these points. Vehicles will be started in the order of entry. Club members will be on duty at the controls and outside observers will man the vehicles as judges and record keepers. Each contestant will be furnished with a large map of the course mounted on a board. It will be covered with shellac and so made rain proof. It will be set in front of the operator against the dash board. Two Prescotts, two Durraeqs and two Toledos, a gasoline and a steam, have already entered. A. R. Pardington, of the committee, will have out that day for the first time a new belt driven gasoline vehicle of his own design.

Day's Run To Philadelphia

George F. Chamberlin and a party of enthusiastic automobilists are arranging for a day's run to Philadelphia early in May to contrast the ease of accomplishment and the small expense as regards fuel consumption with the laborious feat and costly relaying of horses attendant on Alfred Vanderbilt's famous four-in-hand coach drive over the same route last autumn. They intend also to show that the roads will be smoothed and improved by the automobiles passing over them, instead of torn up and injured by galloping horses, as was the case with young Vanderbilt's wild ride.

Association for the Multitude

A cablegram from Paris says that the proposed Association Generale de l'Automobile in Paris is interesting all Parisian automobilists. The association, with the Marquis de Dion at its head, is expected to reach great proportions. The aim of the club is to do for automobiling what the touring club has done for cycling. The poorer chauffeurs, who thus far have been unable to aspire to the palatial premises on the Place de la Concorde, are now happy at the idea of having their own headquarters.

First Club Organized in Texas

Houston, Tex., March 18.—The first automobile club in this state has been organized through the instrumentality of Mrs. L. M. Adams, of this city. With a full membership the association elected officers and has already completed arrangements for a run. J. R. Myers was elected president; D. E. Sturgis, treasurer, and Mrs. L. M. Adams, secretary. Club rooms have been arranged in the Binz building and sessions are to be held every Wednesday afternoon at 4 o'clock.

The California Automobile Club has arranged for the use of a parlor at the famous Cliff House, San Francisco, every Sunday afternoon and regular meetings are to be held there. Luncheon will also be served. On Friday of last week the club held a well attended moonlight run. A. C. Aiken has been elected secretary. His office is at 415 Montgomery street.

CHICAGO CLUB IN FINE FORM

Enthusiastic Meeting After the Show Decides on the Location of a Club House and the Promotion of Important Events

THE Chicago Automobile Club may now be said, for the first time in its history, to be on a businesslike basis. Started, in a somewhat half-hearted way, in 1900, it existed, for some months, without an effort being made to make it useful to its members or to the cause. Later there was a sort of reorganization, and new officers were elected. They have been trying, for a long time, to pick up the thread where it had been dropped and make the club something beside a name. And they seem to have succeeded. The present officers are all enthusiastic and willing to give the necessary time to the work to make the club a success. The president is F. C. Donald; vice presidents, C. H. Tucker and E. F. Brown; treasurer, F. X. Mudd, and secretary, W. L. Githens.

About 3 months ago the club held a rousing meeting at the Sherman house. It was the kind of meeting the club needed to let the members know that the club was worth supporting. Then followed a long period of inactivity until show time. The committee in charge of the entertainment, racing and so forth did their work well and were rewarded, at last Thursday's meeting, by an attendance in keeping with the size of the membership. Naturally the first thing, in the matter of importance, before the meeting was the report of the late show. It pleased everyone so well that a new wave of enthusiasm took possession of the meeting and plans were made to place the club on a substantial basis. The club house committee reported, and was requested to bring in, for the consideration of the next meeting, a detailed statement of the demands of the owner of property on Michigan avenue. Committees were appointed to revise the constitution, on runs and tours and on races. Then the cups won on the racing machine at the late show were presented to those who had braved the demands of the members for speeches and come to the meeting to receive them. Finally the inner man was taken care of and the members separated at a late hour very well satisfied with themselves, the club and everything else.

On April 1 the initiation fee, which was suspended some months ago, is to go in force. The club will have at that time over 100 members and 200 is the mark set for the end of the summer.

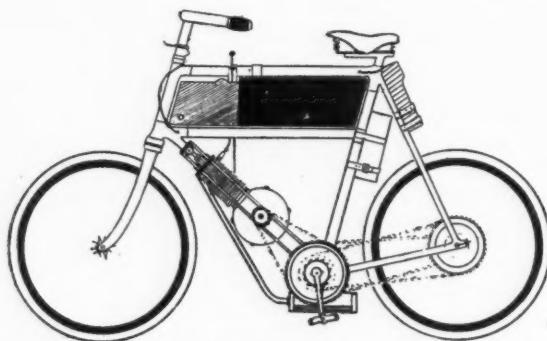
The indications now are that within 60 days, and possibly earlier, the club will be occupying its own quarters on Michigan avenue; that there will be a programme of runs and tours; that a race meeting will be arranged and, finally, that there will be an endurance run, probably of the 100-mile non-stop variety tried so successfully in the east. Among late applications for membership are a number of new owners representing the best element of Chicago society.

MOTOR BICYCLES AT ENGLISH SHOW

First Application of Worm Gearing Attempted by Mr. Accles, An American Resident of Great Britain—Humber, King and Clyde Machines.

AT last England has awakened to the fact that there is something more than common interest in the motor bicycle if some of the articles in the trade press may be taken as a critic. At the recent Crystal Palace show, many new machines were shown and some of them embody ideas that are of interest. Bicycling news illustrates a number of machines, and gives partial descriptions as follows:

"Three exhibitors were bold enough to pin their faith to chain driving for the motor drive, and one of them, the Humber, took the award for the best all-English motor bicycle, although it does not necessarily follow that such award was made in consequence of the machine being driven by a chain, general excellence of design and construction being taken into account. The most interesting of these three types to the general

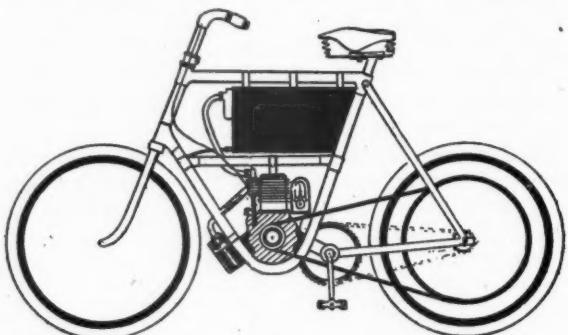


The Humber.

trade is that shown by the Bowden Brake Company, because the clutch which enables a chain drive to be used with this machine is readily obtainable by the trade at large.

The Humber is interesting, not only to the agents who may have to sell it, but to the trade generally, because it represents a style of driving that has not hitherto been described, although it is by no means new so far as the continent is concerned. Three chains are used, one on the right-hand side being for the usual pedal drive for starting purposes, and the other two on the left-hand side for the motor drive and also for the pedals to start the motor. These two chains transmit the power from the engine to the road wheel in two steps, somewhat in the same way that the power of the front driver on a tandem bicycle is transmitted through two chains to the driving wheel; but whereas on a tandem the rear rider's pedals are geared rigidly to the intermediate sprocket, on this machine the intermediate sprocket is free to revolve forward independently of the pedals, and it has an outside ratchet and dog whereby the rider can drive the chains forward to start the engine, which is necessary because

where the engine drive joins the road driving wheel, there is a free-wheel clutch on each side of the hub. Thus the action of driving is that the pedals first start the road wheel and move the bicycle forward, the ratchet and dog above mentioned simultaneously start the short

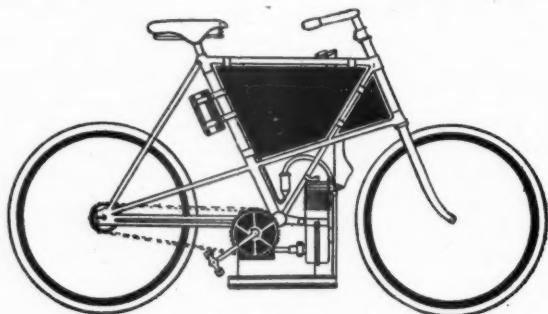


The Clyde.

chain which will be seen in the illustration, conveying the pedal power to the engine shaft.

"When the engine has started working, the ratchet and dog allow the rider to keep his pedals at rest while the engine drives first through the same short chain on to the intermediate sprocket, and thence by the longer chain to the road wheel hub. The drive is thus geared down in two steps, so that a much smaller sprocket can be used on the road wheel than when the chain drives direct from the engine to it. The cylinder and crank case are contained within four parallel tubes, which take the place of the usual bottom tube of the bicycle frame, and the cylinder is longer than usual in proportion to its width, giving a long piston rod, which consequently remains straighter (more nearly parallel to the cylinder) in all positions of the fly-wheel crank than when a short piston rod is used.

"In place of the usual style of levers, there are two vertical plunger rods on the top tube of the bicycle, that on the left controlling the mixture, whilst that on the right opens and closes the exhaust, and regulates the timing. A surface carburettor is fitted in front of the petrol tank. The clutch is a constant friction



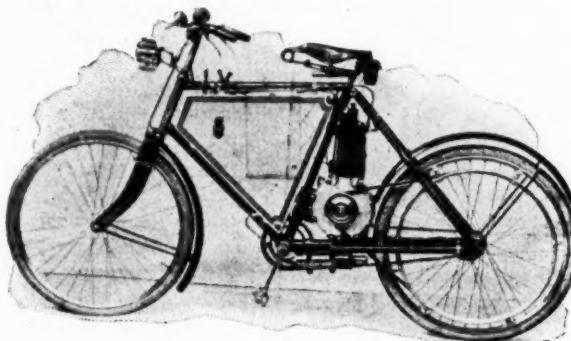
The Accles.

clutch, fitted outside the crank case, without a lever to throw it out of gear; it is provided, therefore, solely so as to permit the gear to slip a little when the engine jerks violently, the spring being arranged so as to permit of such slip taking place at about the same

stress of pull as would allow a well-adjusted belt to slip."

In detailing information regarding the construction of special frames for motor cycles, the Clyde is mentioned as being original, having been constructed somewhat on the plan of a U, in the bottom of which the motor rests, having lugs for attaching to the frame top and at the bottom two sides. The frame illustrated shows the position of the motor, and that a belt is used for driving purposes. The Simms-Bosch engine and magneto is used.

"Although worm gearing has been long known to mechanics for various purposes," the report continues, "it is quite new as regards bicycle driving, and its adaptation to the purpose of a motor bicycle in the Accles



The King.

(Mr. Accles, by the way, is an American), enables the engine to be carried in front of the crank bracket, with its fly-wheels transverse to the plane of the road wheels. The engine thus drives direct to a shaft which projects farther than usual, and has a worm cut at its rear end which gears into a corresponding worm mounted on the pedal crank shaft, so that the same chain conveys both the rider's pedal power and the motor drive to the road wheel. It is a promising system, but at present nothing definite is known of its practical achievements."

The English machine, belt driven, adjudged the best, was made by King & Co., of Cambridge, being fitted with a 2½ De Dion motor mounted vertically behind the seat mast, the back forks being lengthened to make room for it. The design of the machine seems to be about evenly proportioned and the weight well distributed. The forks are double in front and extremely heavy in the rear, the cross brace or lug which joins the rear forks to the tube running into the hanger, also supporting the base of the motor. The arrangement of all the parts is accomplished with less detraction from appearance than in any other pattern so far produced.

Automobiles and Bicycles Gone Abroad

Washington, D. C., March 19.—The figures showing the exports of bicycles and parts for the week just ended from New York are as follows:

Antwerp, bicycles and material, \$608; R. R. velocipedes, \$250. Amsterdam, bicycles, \$15; bicycles, \$1,

650. Argentine Republic, bicycles, \$608. British Guiana, bicycles and material, \$187. Bremen, bicycles, \$50. British West Indies, bicycles, \$235. British East Indies, bicycles, \$634. Bicycles and material, \$252. Bergen, bicycles, 3 cases, \$75; velocipedes, \$78; bicycles, \$157. British Australia, bicycles and material, \$840. British possessions in Africa, bicycles and parts, \$3,816; velocipedes, \$46; sporting goods, \$65. Copenhagen, bicycle material, \$3,644; bicycles, \$21,256. Christiania, bicycles, 26 cases, \$648; bicycle material, \$34. China, bicycles and material, \$2,034; bicycle material, \$151. Dutch West Indies, bicycles and material, \$94. Dutch East Indies, bicycles and material, \$952; bicycles and parts, \$2,778. Ecuador, bicycles, \$40. French West Indies, bicycles, \$75. Glasgow, bicycle material, \$375. Genoa, bicycle material, \$2,207. Hamburg, bicycles, \$5,302; bicycle material, \$1,512; velocipedes, \$55. Hango, bicycles and material, \$310. Havre, bicycle material, \$3,769; bicycles, \$3,014. Japan, bicycles and material, \$1,315. London, bicycles, \$1,710; bicycle material, \$5,803; sporting goods, 85 cases, \$3,977. Liverpool, bicycles, \$928; bicycle material, \$433. Lausanne, bicycles and material, \$1,600. Oporto, velocipedes, \$60. Philippines, sporting goods, \$134; bicycle material, \$50. Randers, bicycles, \$9,514; bicycles and material, \$738. Stockholm, bicycles, \$5,950. Southampton, bicycle material, \$2,779.

The figures showing the exports of automobiles and parts from New York are as follows:

British possessions in Africa, motor vehicles, \$382; gasoline motor car, \$380. Cuba, auto vehicles, \$1,240; velocipedes, \$26. Hongkong, motor vehicles and parts, \$1,175. India, motor vehicles and parts, \$5,578. Philippines, motor vehicle parts, \$105. Peru, auto-vehicles, \$3,000.

The Edison Battery Bugaboo

An eastern paper says that it is generally understood that the non-stop section, for electric carriages, included in the endurance rules of the automobile club, was primarily to give the Edison battery an opportunity to prove the claims of its inventor that it can drive a machine 100 miles without a stop. Even if this were true—which is unlikely—there would be nothing in the performance which has not been accomplished before. It must be still fresh in the minds of the trade, at least, that a Porter battery drove a carriage nearly twice the distance on the Chicago boulevards last summer. As a matter of fact, the sooner people stop worrying about the Edison battery and give attention to things which are already on the market the better it will be for the electric vehicle industry.

Gould's Offer To Road Improvement

George Gould, a picture of whose extensive automobile caravan was pictured in MOTOR AGE last week, has offered through State Engineer Budd, of New Jersey, to pay one-third of the expense of improving the roads between Lakewood not contemplated or included in the good roads system of that famous winter resort.

CANARY IS ONCE MORE A BIRD

World-Famed Trick Rider Returns and Outdoes the Cycle Whirlers—Interesting Story of His First Trials

THE cycle whirl is the most interesting and perhaps the most dangerous thing lately invented for the edification of the sensation-loving public. The first performances in this country were given only a few months ago, yet there are a dozen or more performers on the stages of the vaudeville houses.

Away back in the dark ages there was a star trick rider named Dan Canary. He may not have been the first man to stand still on a high bicycle, or to do any of the simple tricks which may experts can perform today, but that he was the originator of practically all the really difficult ones and was so far ahead of all other performers in his day that there was no comparison, is not open to question. Having, when a small boy, practiced all sorts of balancing tricks, he took to trick riding on a bicycle as a duck takes to water and, having given exhibitions in this country without much profit, went to England, where the sport was further advanced and where he became such a rage that no salary seemed to be too high.

Canary left the scenes of his triumphs about 10 years ago and went into more serious but unfortunately less profitable pursuits. Three months ago he was approached by Kilpatrick with a proposition to tackle the cycle whirl. He consented, commenced to practice and soon took to the business as naturally as of old.

But Canary is an originator. He soon tired of doing the same old act as every one else and decided to try the ordinary, or high, bicycle. Relating his experience last week he managed to keep a crowd of Chicago Automobile Club men in a roar, for Dan is a good story teller as well as a good rider.

"We were in Cincinnati," he explained, "and I hunted up an old dealer named Bennett." Many an old timer will remember the veteran who was for so many years manager of the cycle department of Kittredge & Co., and later agent for the Columbia. "I asked him if he had an ordinary bicycle and he looked at me with a half amused and half puzzled expression. He wanted to know whether I really meant one of the old high machines and said he had three or four on the top floor, but had not seen them for years. I went up and dug out of the wreck one of the oldest of Columbia Standards, with a tread about a foot wide. I bought it for \$5, fitted it up with pedals and so forth and tried to ride it. Say, I felt as if I were up in a balloon.

"Then I commenced to practice. How to get the thing on the slats puzzled me. I tried it again and again and took some of the 'measliest' falls I ever got in my life. After about three days' trying I suddenly found myself actually moving around the thing. That was Saturday morning and I announced to my partner that I would 'put on the act' that night. He told me I was crazy and when, after I had concluded my regular ride, I started out with the high wheel I believe he

expected to have to bury me. And the people! How they laughed! I believe half of them had never seen an ordinary. But I got it going all right, made a few circuits like a crazy man and then commenced to wonder how in the world I could get off without falling off. An inspiration came to me. I slid down the backbone, to get my weight near the ground, and came down the slats as gracefully as you please, winding up in the center of the stage with one of the old-time spins. It was a hit and I have been doing it ever since."

And that isn't all. The renowned Daniel will make an addition to the act in a few days that will take the wind out of the sails of most of them. But the facts are a secret.

The Motor Cycle Endurance Run

The members of the Metropole Cycling Club, of New York, organized some time ago to revive the waning interest in cycling, and which is promoting a motor cycle endurance run between Boston and New York, to take place on July 4, is hopeful that the event will be a great success. One of the members of the committee in charge states that the number of applications for details indicates a good entry and that the makers, to whom it will be necessary to look for support in large measure, seem to be deeply interested. It is hardly to be expected that there will be a large field of competitors, for despite the booming of the motor bicycle the number of makers who can supply successful machines may be counted on the fingers, but the event will give the sport a needed impetus. The club's enterprise is to be commended and it worthy of all the support which can be accorded it.

Cycling Notes from New York

New York, March 23.—With the return of A. G. Batchelder, chairman of the N. C. A. board of control, from the south, which is expected this week, cycle racing will begin to force itself to the front. "Batch" has been in Florida for several weeks trying to recuperate from the shock of his automobile accident last autumn with Fournier. This week he is up in the North Carolina pines for the final bracer before beginning the work of what promises to be a lively summer campaign of cycle racing. In his absence "Al" Reeves has been a very successful and popular "It." Being the racing board chairman in addition to secretary of the Road Drivers' Association, with a big speedway parade on his hands, and automobile editor of the Mail and Express, has not feasted this hustling Poo-bah a little bit.

Fred Voigt, the popular Vailsburg manager and now proprietor of the New Haven coliseum, is convalescing from a recent illness. There has been a rumor that he has made some advances toward adding Manhattan Beach to his circuit.

Indications point to a renewal of life in the League of American Wheelmen. The New York state division's renewals for the first quarter showed an excess of 210 over those of 1901. How extensive wheeling still is in New York state is shown by the fact that 160,000 side

path licenses were taken out last year. L. C. Boardman has returned from a trip through cycle manufacturing centers east and west and reports rosily of actualities and prospects.

Will C. Stinson, who went to Paris to race leading European pace followers on Victor Breyer's new Buffalo coliseum track, was reported on Thursday by cable to the N. C. A. to be ill with some affection of the eyes and unable to fill his foreign engagements. The cable asked that Bobbie Waltham be secured to fill his place.

Major Taylor was in the N. C. A. office on Friday to get a check for \$1,700 advance money before starting, on Tuesday, to fill his European engagements prior to the opening of the national circuit here in July. He had with him a bride, whom he had just married. He will ride the Iver Johnson again this season.

Tommy Hall, the English boy who won popularity in the six-day race, and Albert Champion, the motor cyclist, are to follow pace this season under the management of James C. Kennedy. They have gone to Washington to train.

A Machine Which is Always Ready

A correspondent writes that he isn't sure whether someone told him this or whether he dreamed it. It's good, anyhow: A Brooklyn doctor, many of whose patients reside in the outlying districts, makes use of an ingenious device to keep his steam wagon in readiness for any emergency. From the wall of his stable hangs a rubber tube terminating in a gas burner. On arriving home he places the burner dimly lighted under his boiler. The gas is controlled by a small tap in his bed room. When the physician receives a sudden call in the night he turns up the gas and by the time he has dressed and reached the stable has enough steam up to start away immediately after lighting his burner.

The park board of Minneapolis has asked the council for an appropriation of \$3,000 wherewith to build new cycle paths. It is generally believed that the request will be granted. Minneapolis already has the most extensive system of cycle paths in this country, and that means in the world.

The Lucia Cycle Co.'s place at Green Bay, Wis., was almost entirely destroyed by fire last week. Happily the loss was largely covered. An automobile owned by the company was among the goods ruined. The origin of the fire is a mystery.

Fournier says he will not take part in any more one-mile races. He believes a longer journey necessary to test the stability of the machine and the skill of the operator. He goes to France in a few days and will return in July.

Sherbrooke, Que.—S. S. MacDonald has sold his bicycle repair business to Messrs. E. and W. Burton, who will carry on the same.

The Favorite Cycle Co., of New York, has been incorporated. The directors are Nicholas Komow, Adolph Corn and Lena Weisman.

THEY MEAN TO BOOM THE LEAGUE

Pennsylvania Cyclists Have Made Plans for Increasing Interest—Annual Meet at Atlantic City

PHILADELPHIA, Pa., March 23.—The annual meeting of the League of American Wheelmen at Atlantic City and the many plans at present being laid out by the Pennsylvania division of the League of American Wheelmen for the revival of cycling interests this coming year should have the effect of putting the sport on something like its former standing in this section of the country.

According to Secretary-Treasurer George M. Schell, of the Pennsylvania division, who has just been in consultation with the new L. A. W. executive committee, everything is being done to build up the sport. Believing that "cycling for pleasure" is the secret of its prosperity as demonstrated by the fact of its popularity in England, where touring is so much indulged in, the Pennsylvania division road books will again be supplied to all new members. This will enable the formation of innumerable trips into the country during vacation time and on half holidays, which, without the wheel, would be impossible.

At the recent national assembly concessions were made on all sides, and the league starts the present season practically out of debt and on a substantial basis. It is therefore up to the division to boom the membership. The Pennsylvania division is out to do its share.

This being the renewal period old members of the division will be glad to take advantage of the recent constitutional amendment by which all back dues are remitted. According to this plan those who, through neglect or indifference, have failed to renew may now return to the fold on payment of \$1, regardless of when their old membership lapsed.

The advent of the new official organ—its once-a-week appearance keeping the members in close touch with league and cycling doings all over the country—is also calculated to increase interest in L. A. W. affairs and to boom cycling this year.

The holding of the national meet at Atlantic City this year will infuse new interest in cycling affairs all over the state, thanks to the proximity of the city by the sea and the easy manner in which it can be reached from all points, either by wheel or rail.

Mail Carts for Paris

One of the reforms introduced by M. Mougeot, the postmaster general of France, was automobile mail carts. These have been running for a year and have given entire satisfaction. It has been decided to greatly extend their use in Paris, gradually entirely replacing horse drawn mail carts. They are also being introduced in the larger towns, such as Marseilles, Lyons, Lille and Bordeaux. The automobile mail carts are capable of accommodating more than double the amount of matter handled by the horse carts and their speed is much higher.

THE CONSTRUCTION OF A MAGNETO GENERATOR

BY L. ELLIOTT BROOKES.

PART II.

FIGURE 5 shows the pulley bearing bracket. The same pattern used for the commutation bearing bracket can be used by making the hub, or boss, which forms the commutator casing, loose, and then removing it after that casting is made and replacing the small hub or boss which forms the bearing for the armature shaft. The casting of bronze for this bracket can then be made from this pattern.

Figure 6 gives two views of the brush rocker frame and also the brush holder. The frame should be of bronze and will require a pattern. A core box will also be necessary, so as to form the two recesses inside the $1\frac{1}{4}$ -in. hole, and which are the same diameter as the brush holder bosses on the outside of the brush rocker frame. The brush holders are to be made from $\frac{1}{4}$ -in. hexagon brass rod, and finished to the dimensions given. A small plug or cap screws into the outer end of each brush holder. The small extension on these plugs should be threaded for No. 10-32 machine screw hexagon brass nuts, which are to be used in making the electrical connection after the machine is assembled and ready for use. Small round carbons $\frac{1}{8}$ in. diameter are used for brushes, and these may be obtained at almost any electrical supply house. Two small springs are also required, of spring brass, about No. 20 or 22 B. & S.

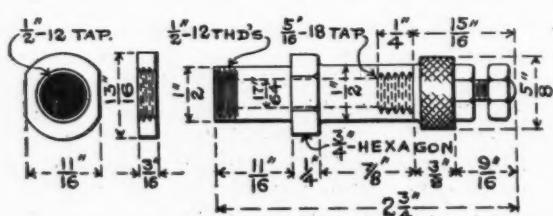
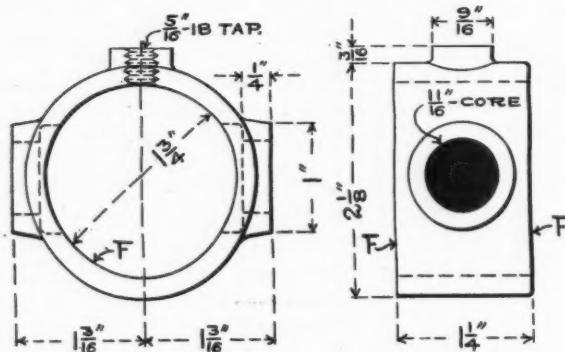


Figure 6.

gauge, to keep the carbon brushes in perfect and yet elastic contact with the commutator. These springs should not be over $\frac{1}{4}$ in. outside diameter and about $\frac{3}{4}$ in. long when not compressed.

Figure 7 is the top connecting plate, and one of the two plates required to hold the pole pieces together, not only after the generator is assembled, but while boring out the pole pieces in the lathe. This plate can be made

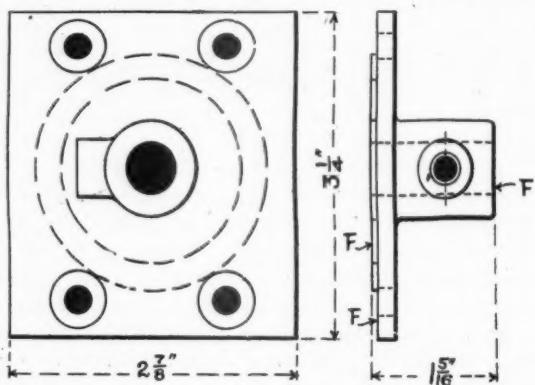


Figure 5.

readily from a piece of sheet brass of the required thickness, or, if not handy, a brass casting can be used.

Figure 8 shows the bottom connecting plate. A pattern will be required, and can be cored out on the under side to lighten the casting. The two connecting plates can be made of brass, bronze or aluminum, but on no account must cast or wrought iron or steel be used, as it would form a closed magnetic path through the magnets and pole pieces and render the generator useless. Figure 9 shows the details of the commutator as well as a view of the same assembled; also the small brass friction washers which are to go on the armature shaft next to each bearing. The fiber washers which are to be used in connection with a small fiber tube (not shown) are also shown in this figure, as are the micanite insulating sections, which go between the commutator segments. The insulating portion of the commutator is made of a piece of vulcanized fiber. The commutator proper can be made from a piece of 1 in. brass tubing (iron pipe size) which is sufficiently larger than the dimensions required to allow of being turned and bored true to size. After the piece for the commutator has been turned up it should be cut into four sections as shown. Before doing this, however, it is perhaps better and easier to drill and countersink the eight holes shown for No. 4-36 flat head machine

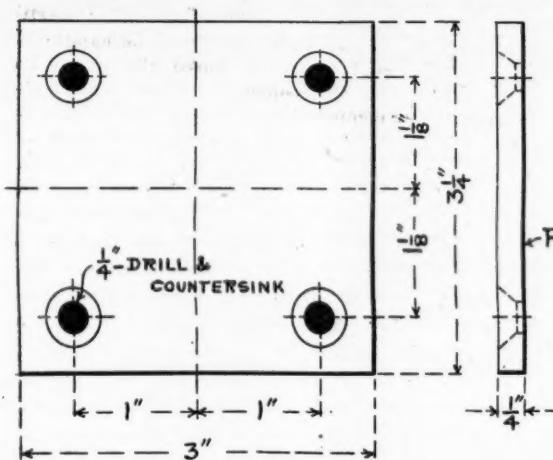


Figure 7.

screws. The commutator sections can then be put in place around the fiber bushing, but the under side of each section should be carefully covered with fairly thick shellac varnish. After spacing them uniformly around the bushing, fill the spaces between with the small micanite insulations shown in the lower right hand corner of figure 9, and secure in place with shellac varnish. Allow the commutator to dry for at least 36 hours before drilling and tapping the holes in the fiber bushing for the No. 4-36 flat head screws. Before assembling the commutator a small groove, as shown, should be filed or cut in the center of each section, between the screw holes, to lay the armature connecting wires in when finally soldering in place.

Figure 10 is a sectional plan and side view of the spools for the field magnets. These are to be made of

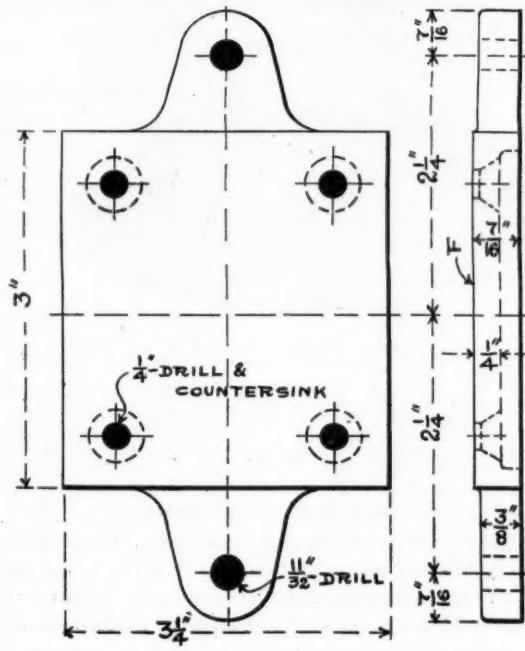


Figure 8.

vulcanized fibre to the dimensions given, and a small piece of wood of half-round section should be fastened in each end of the core opening as shown, so as to have the wire wound in flat oval instead of rectangular section, as it makes a much better and neater job.

After the machine work upon the parts of the generator is done, the next thing will be winding of the armature. Flat oval washers should be cut out of press board about 1-32 in. thick, $\frac{3}{8}$ in. wide and $1\frac{1}{8}$ in. long, with holes in them of the same size as the core part of the armature poles, which is 5-16 in. wide and $2\frac{1}{4}$ in. long. These washers can be cut open in one end and readily slipped into position, when they should be secured to the top and bottom of each armature pole piece with shellac varnish. A small strip of sticky tape, which is used for electrical purposes, should be

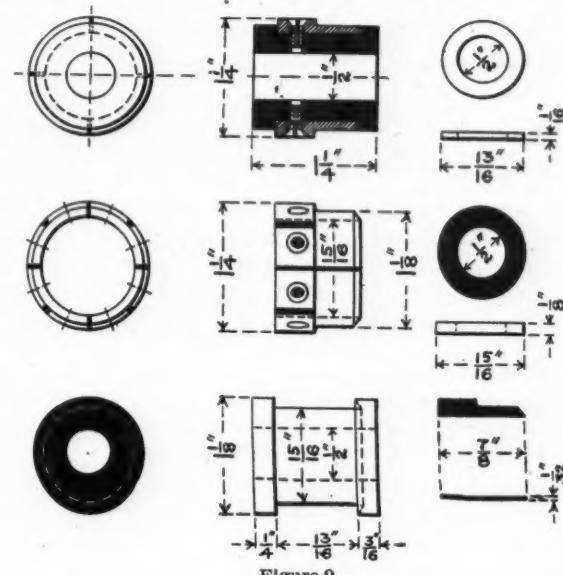


Figure 9.

wound around the core between the press board washers, on all four of the armature poles, so as to thoroughly insulate the iron of the cores from the wire which is to be wound around the same. To properly wind the armature, unless it is wound by hand, two blocks of hardwood should be obtained at least 2 in. square, and one of them should be turned to about $1\frac{1}{2}$ in. diameter for a length of at least $1\frac{1}{2}$ to 2 in. Make the block about 3 in. long over all, and the other one about 1 in. long; file or cut a groove across the 2 in. square part on both blocks, to match the radius of the armature, taking care to get it true with the $1\frac{1}{2}$ in. turned down part. In the short block put a countersink on the opposite side to the groove and central with it also. The 3 in. piece can now be put in the lathe chuck and securely held in place on the turned down part. After truing the piece fairly close, place the armature in the groove, with, of course, its axis at right angles to the lathe centers. While holding in this position place the short block of wood on the other side of the armature and move up the tail stock of the lathe, so as to

allow the dead center to enter the countersink in the short block, and screw it up sufficiently tight to keep the armature in position while being wound.

The next portion of this article will describe the

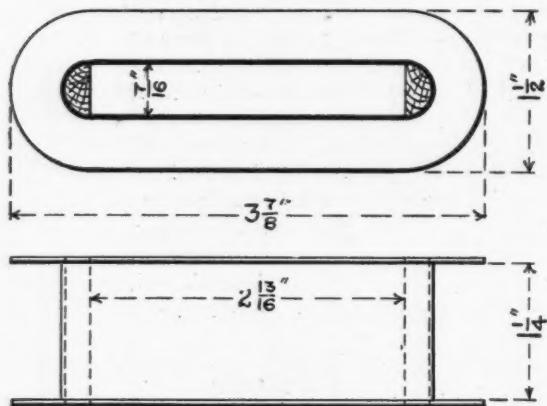


Figure 10.

method of winding the armature, making connection of same to commutator, winding field spools and assembling the generator.

Automobiles Are Now a Necessity

The Engineers Society of Western Pennsylvania held its regular meeting last week at Pittsburg. The meeting was preceded by a dinner and reception at the University club at 6 o'clock.

H. P. Maxim, engineer of the vehicle motor department of the Westinghouse Electric and Mfg. Co., read the principal paper of the evening on the subject of "Automobiles." It was a complete and scientific history of the automobile from its inception to its present perfection, and in conclusion he said:

"The mechanically propelled vehicle, independent of fixed tracks, is a development resulting from the need of better transportation rather than because of any fad. Our cities have already spread to areas which make the irregular transportation of passengers and merchandise over them most difficult, and the continued development of the prime cause of it all—the electric street car—is daily increasing the difficulties. The automobile comes as a successor to a part of the work of the horse; just as the electric street car came as a successor to a part of his work. From the very nature of our civilization it becomes an absolute necessity. The mechanically propelled street vehicle is as inevitable as was the mechanically propelled boat, railroad train and street car, and we might as well include such institutions among our fads as to include the automobile. When it comes to their manufacture, where we will build one for pleasure, sport or fad, we will build 100 for serious work."

Shelby Company's Western Trade

For a time the business of the Shelby Tube Co. was handled exclusively from Pittsburg. The company became convinced, however, that the demands of the western trade could be handled more expeditiously from

Chicago and decided to open an office in the Western Union building. Of course it was placed in the hands of E. K. Orr, who has so long represented the house in western territory, and the wisdom of the change is already apparent. The company's cold drawn weldless tubing is in such enormous demand, for such a variety of purposes, that it is almost essential to be in close touch with the consumers, of whom there are thousands in and near Chicago. Hence Mr. Orr finds that the new office has been a great advantage and has facilitated the handling of the business to no small degree. The facilities for manufacture are in better shape than ever before and the company is in shape to handle promptly almost any volume of business it may secure.

The history of the Shelby company has been of the most remarkable character. It is so short a time since every foot of tubing used in this country was imported from England that it seems incredible that we are now not only supplying our own market, and able to supply it three times over should occasion arise, but are shipping millions of feet of tubing to the country which formerly obtained all our patronage and, for that matter, to every other country in the world. Wherever seamless cold-drawn tubing is used the name of Shelby is pre-eminent. There have been a number of consoli-



E. K. ORR,
Manager of the Western Branch of the Shelby Steel Tube Co.

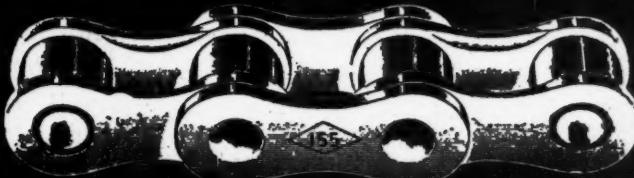
dations of the tubing plants of England and Germany, but there is none today which compares with the Shelby company in the magnitude and quality of its output.

Vanderbilt is Busy in France

According to reports from the other side, Vanderbilt is already busy over there. He has received his new Mercedes, which, it is said, is capable of 70 miles an hour. His first trip was from Stuttgart to Metz, and thence to Paris.

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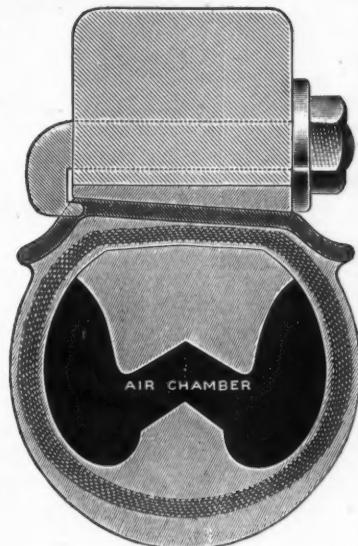
A weak link will render the strongest chain useless, and a poor tire will make the finest automobile a source of worry and danger

An Automobile with

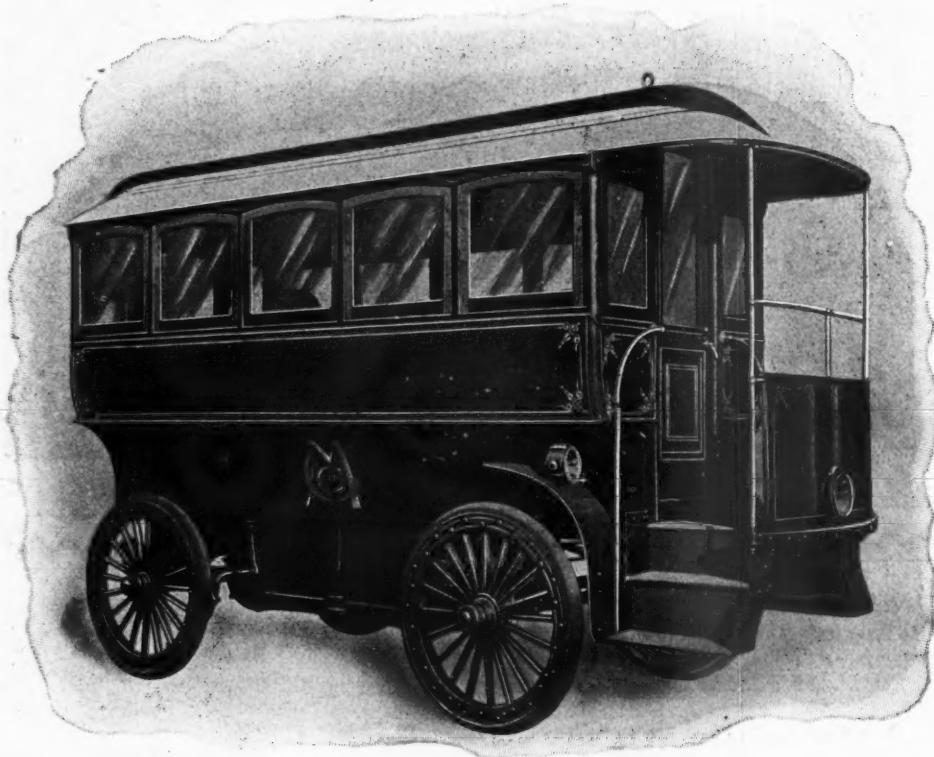
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—WRITE FOR CATALOGUE—

Chicago Motor Vehicle Company
326 Wabash Ave., Chicago, Ill.

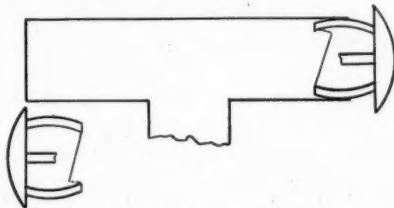
Manufacturers of Unequalled HYDROCARBON Motor Vehicles.

CORRESPONDENTS' VIEWS AND QUESTIONS

Philadelphia, Pa., March 12.—Editor MOTOR AGE:—I shall esteem it a favor if you will give me the benefit of your experience respecting the disadvantages of "backfiring" in steam automobiles and whether any effective means have been devised to remedy that defect. I noticed in the English press that an expedient has been illustrated, but have not been able to ascertain whether it has proved a success. The expedient I refer to was that of using talc flaps at the outer ends of the smoke stack. I would be glad to have the dates of papers giving experiences of automobilists who mention and comment upon the defect of "back firing."—Yours, etc., Bainbridge Wilson.

The experiences of users of vehicles have been given from time to time in these columns. Two appeared in the issue of Aug. 15, and these are here reproduced for the benefit of those who are still troubled. "My only trouble of late," said the first correspondent, "has been with the burning back of my fire which I have at last conquered and at the same time stopped the occasional blowing out of the fire by a strong wind. Last week, while I was touring on the south shore of Long Island near Westhampton, the wind was blowing very hard and every mile or two I was obliged to stop to put out my fire which continually blew back and kept everything almost white hot. I plucked some branches from the bushes by the road side, pushed them in the windward side of the draft chimney and continued my ride from there to Westhampton to Patchogue and from there to Port Jefferson without a recurrence of the trouble. This gave me an idea, and as soon as I arrived at Bridgeport I had made a couple of stoppers, of Russia iron, such as are used to stop stove pipe holes in chimneys, and had attached four spring steel prongs. On the end of the prongs is a circle of Russia iron with a mica flap hung by a loose hinge so that a puff of wind, blowing in the draft chimney, will close it. I enclose a rough drawing of the same which I think shows the idea.

By pushing the caps close into the smoke chimney steam can be held up for a much longer time by retaining

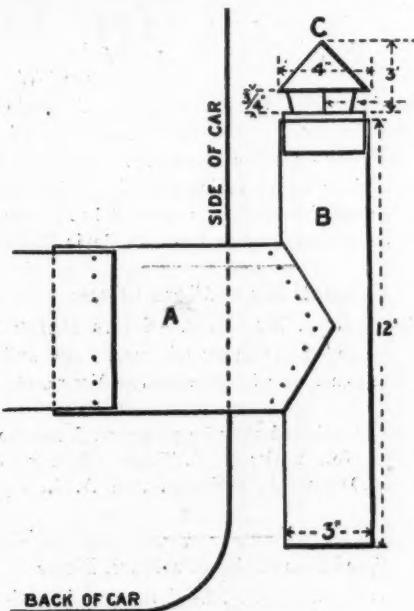


An American Device

more heat in the fire box when the fire is out. In practice I find that the position of the cap can be reversed with good effect, making the mica valve upside down. I suppose every user of a steam vehicle has been bothered more or less in lighting his fire with and without a torch, by the flame blowing out in his face from getting too much gasoline in the burner. For the past month I have been using a gas lighting electric torch to light my fire

instead of matches and it has been a great comfort to me. When my torch is heated and in place I simply push the end of the electric lighter into the fire box, squeeze the spring, turn on the gasoline valve and "there you are." It is impossible to get enough gasoline vapor through your burner to blow out in your face."

The second was from an English correspondent who contributed this description of his device: "It consists of



Device Used Successfully in England

a roll of thin sheet iron A, which fits the present chimney. Attached to A, at right angles, is another sheet iron tube, 3 in. in diameter, B, whose axis is parallel to that of the car, the side of B being about 1 in. from it. A cap C, in the form of a cowl, slips into the end of B. The wind striking the cowl is deflected from the entrance to C, causing a partial vacuum at that point, thus assisting the draft of the fire, instead of hindering it. If a strong following wind is blowing, C is placed in the opposite end of B. For a side wind, it does not matter in which end of B C is placed. As a rule, however, C can be left nearly all the time in the position shown in the sketch. The supports of the cap C may be of spring steel, as described in the device mentioned by Mr. Bishop.

Vibration of Two-Cylinder Motor

West Summerville, Mass., March 20.—Editor MOTOR AGE:—Will two $4\frac{1}{2}$ -horsepower two-cycle motors coupled together give as much vibration as a single cylinder 6-horsepower two-cyclé motor, for marine purposes?—Yours, etc., A. L. Dearborn.

It depends on how the motors are connected. If both cranks are set at the same angle, so that both impulses are felt at the same time, the vibration will be greater. If one crank is set opposite the other so that the pistons will travel in opposite directions the vibration will be

minimized on account of the mechanical balance; there will be the vibration set up by the two combustions, but it will not amount to much. Care must be taken in connecting the two motors, if they are to work on a common shaft, that the alignment is perfect. When using two cylinders in the manner suggested it is better to mount them on one base so that the bearings of the crank shaft may be maintained in line with another at all times.

English House Wants Agencies

London, March 11.—Editor MOTOR AGE:—We have a good connection with the cycle trade and would like to take an agency for or have the sole control of a good make of tool bag or other accessory. We shall be glad if you will place us in communication with first-class houses which are thoroughly competent in this market.—Yours, etc., Merzbach, Lang & Co., 9 Bevis Marks, E. C.

Wants Sun and Planet Gears

Iowa City, Iowa, March 17.—Editor MOTOR AGE:—Will you please let me know where the sun and planet transmission gears can be procured?—Yours, etc., E. D. Carr.

The gears mentioned may be procured from the Upton Machine Co., New York; E. R. Thomas Motor Co., Buffalo; P. J. Dasey Co., Chicago, and A. L. Dyke, St. Louis.

Speed Possibilities of a Small Motor

Greenville, Tex., March 18.—I can get but about 500 revolutions per minute from a small $1\frac{1}{4}$ by 2 in. stroke motor I have designed and built. It has one cylinder only but two pistons. The ignition is by wipe spark and takes place just before the end of the compression stroke is reached. The exhaust valve opens and closes at the proper time. It seems to run with wonderful power at times, although compression is not good. Please explain what must be done to get higher speed. If it will interest your readers I can send drawings of my engine.—Yours, etc., T. H. Strunk.

Judging from the information given it is possible that the trouble is caused partly by the low compression and partly by the form of ignition. Unless compression is good the speed of the motor cannot be increased to the point where the highest efficiency can be obtained and by using the mechanical form of ignition springs are undoubtedly used in some part of the device. The springs may be too weak to perform their functions in the time allotted them when the engine is running at 500 or more and consequently the explosions cannot take place regularly, resulting in cutting down the power. Jump spark ignition is best for high speed motors. By that method the time of the spark is mechanically arranged, and as there are no springs the speed at which the motor is operated makes no difference. The spark will take place exactly at the same time on each stroke. The mechanical spark depends, to a great extent, on the springs used for carrying the parts back to their starting positions after the contact

has been made, and as every spring is limited as to the speed at which it will perform its work and if the limit of movement, or, in other words, its ability to recover its normal position is exceeded, it cannot operate properly. That, of course, makes the motor as a whole inoperative beyond the limit of elasticity of the spring.

The construction and successful operation of a single cylinder motor with two pistons is a difficult problem. The fact that the two pistons separate so rapidly reduces the power of the compression so quickly that it has not time to perform its work. The internal combustion motor depends entirely on the expansion of air. To get the desired result a hydrocarbon vapor is mixed with the air in such quantity as to form a combustible gas. The hydrocarbon taken in with the air is used only to generate the heat necessary to make the air expand, and as the heat generated is increased by compression it is easily understood that to get all the power possible the compression in the cylinder must be high. If there is but one moving part by which compression can be reduced the power generated will be greater than if two confining walls of the cylinder were moved in opposite directions. In the latter case the compression or force generated by combustion is allowed to expand twice as fast as in a cylinder in which only one piston was used and consequently dissipates the heat so quickly that it has not time to do its full amount of work while expanding. This statement is made on the understanding that the two pistons in the motor move in opposite directions and that the combustion takes place between them. The drawings will be useful if there is anything new about the construction.

Tandem Cylinder Gas Engines

Chicago, March 24.—Editor MOTOR AGE: Can you inform me if a gas engine working on the principle of a steam engine (that is, to receive an explosion at each end of cylinder) could be successfully packed where piston rod goes through stuffing box? Do you know of any such engine being built at the present time?—Yours, etc., Robert H. Richter.

Tandem cylinder engines, single and double acting, are made on the lines suggested by the Standard Automatic Gas Engine Co., Oil City, Pa., in sizes ranging up to 2,000 horsepower. The Sargent engine, of the same type, in 50 horsepower size, can be seen in Chicago at any time by calling at the Elms plant, Morgan and Fulton streets. One of the Standard engines of the same size is in daily operation at the Globe-Werneke building, next to the Wellington hotel, on Wabash avenue.

A year ago there was not an automobile in Houston. Now there are more than a dozen. With all the enthusiasm characteristic of owners of the new vehicles elsewhere, the devotees of the new sport are more than active in gaining all the benefits that can be derived from the investment.

THE OHIO AUTOMOBILE COMPANY
WARREN, OHIO

Build....

Packards

Designed for

Reliability

Endurance

Speed

Long Distances

All Roads

All Weather



Model "F" Touring Car.

Made with Detachable Tonneau.

A SELF-PROPELLING CARRIAGE ALWAYS READY

"Ask the Man who Owns One"

PARDEE & COMPANY,
1404-06 Michigan Boulevard,
CHICAGO.

{ Distributors
for the West

New Kelly Generator ...

For Steam Vehicles
Improved—Perfect in Every Way



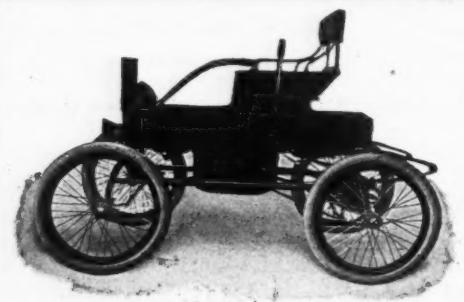
Drip cup unnecessary in starting—Aluminum case over generator—All connections on the outside—Strongly made—Easily adjusted—No flaring or flashing in lighting, even in strong wind. A quick and powerful generator—Main fire valve controlled at seat—Small and neat in appearance and adapted for any machine.

Our new One-Piece Cast Burners have been greatly improved both in power and strength. No wedged tubes in its construction. All in one piece and easily cleaned.

Address, KELLY HANDLE BAR CO., Cleveland, O., U. S. A.

THE BAKER

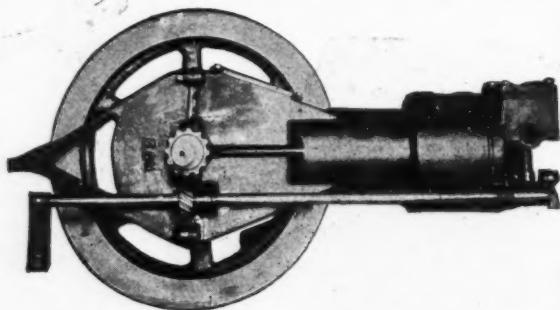
IF IT'S A BAKER IT'S THE BEST
The Most Efficient of all Electric Vehicles



THE LIGHTEST WEIGHT
THE STRONGEST MADE
THE BEST FINISHED



We will send you a Catalogue, or we will write you. Address
The Baker Motor Vehicle Co.,
CLEVELAND, OHIO



Our New Runabout Engine

No 2

Made the "Hit" at the Chicago Show. Cylinder $4\frac{1}{2} \times 6$ in.; same size as that used in the popular light wagons of the day.

\$160.00 IS THE PRICE.

With two-speed forward and reverse spur gear transmission. Where other transmissions use $\frac{3}{4}$ in. and 2 in. bearings on shaft we use $2\frac{1}{8}$ in. and 4 in. respectively. How does that strike you—and all for \$160.00.

We are making prices to manufacturers of vehicles in quantities that are sure to get your business. If you are in the field for motors and transmissions in tens, twenties or hundreds, write us—straight business only.

Our new motor No. 3, cylinder $5\frac{1}{4}$ by $6\frac{1}{2}$ will be ready in thirty days, with or without transmission. Same general design and dimensions over all in length and width. Get quotations in quantities with and without accessories.

THE P. J. DASEY CO.

19-21 La Salle St., - - - CHICAGO, ILL., U. S. A.

THOMAS MOTOR COMPANY'S LATEST MODEL

That most important consideration in a motor carriage, ease of access to the motor itself, is shown to have been carefully studied by the E. R. Thomas Motor Co., of Buffalo, whose new Model 90 motor, assembled on a running gear, is shown in the accompanying cut. The specifications of the motor are as follows: Length over all, 36 in.; diameter of crank case, 11 in.; width of



E. R. THOMAS,

Founder and President of the E. R. Thomas Motor Co.

crank case, $3\frac{3}{4}$ in.; diameter of fly wheels, 20 in.; weight of fly wheels, 110 pounds; weight of engine and fly wheels, 190 pounds; total width, 26 inches; bore, $4\frac{1}{2}$ in.; stroke, 6 in.

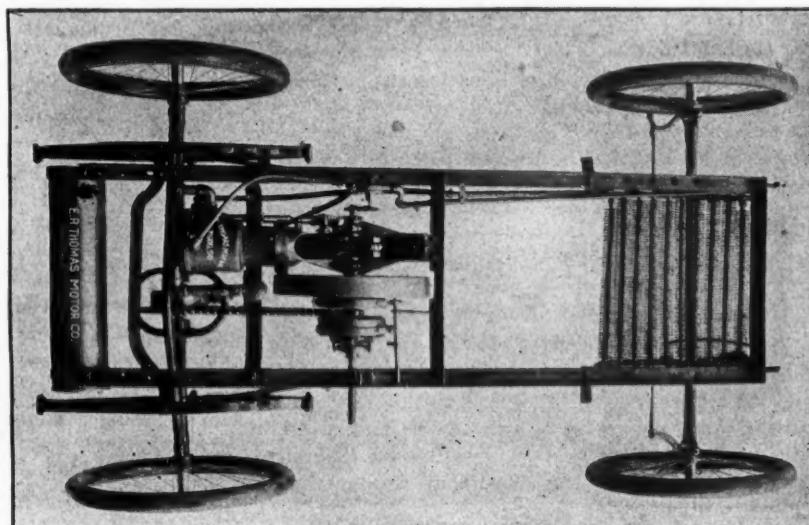
The cylinder and valve chamber are cast integral, both being surrounded by a jacket. This construction permits the cores to be properly balanced and supported in the mold, giving free vent for gases, which gives a perfect cylinder and valve chamber, free from blow and sand holes, etc. The cylinder is of such form that it can be finished perfectly and in case of any wear can easily be rebored, scraped, etc., without disturbing other parts of the engine. The crank case or base is cast in one piece to which cylinder is bolted; the case is open on top exposing as it does cranks, connecting rod, piston, etc., in plain view, and in case of repairs is a great advantage, permitting easier access to the working parts of the engine. The lid covering the crank case is removed by loosening a thumb screw, when the lid or cover can be lifted free from the engine. The journals are

placed at an angle of 45 degrees which receive the force of the explosion and the weight of fly wheel, etc., with practically no weight on the caps; bearings are large in diameter and wide and lined with bearing metal.

The valve mechanism is operated by one cam and two rods; the exhaust direct; the inlet through a bell crank and rod. The arrangement is very simple and absolutely positive in operation; the exhaust lift is operated by a crank and cam causing the exhaust valve to open during part of the compression stroke of the engine, allowing starting very easy. This spark controller is very simple, is in form of make and break arrangement which is operated by a cam. The inlet valve can be removed by loosening two nuts and the valve can be lifted from the engine, exposing at the same time the exhaust valve, which can be quickly taken off for grinding, etc.

The cylinder head can be removed by taking off five nuts and can be removed without disturbing any other part of the engine. The spark plug is located where it receives the cool incoming gases and is not easily fouled. The fastenings of the engine to the frame are by two holes in the base and two in a boss which is cast to the cylinder. The general construction of the engine is such that the proper materials can be put where they are required without interfering with the other parts. The company will furnish motors, transmission gears, lever control and brakes, circulating water pump, radiating coils, float feed carburetor, vibrating induction coil, muffler, batteries, spark plugs separately or set up ready for frame.

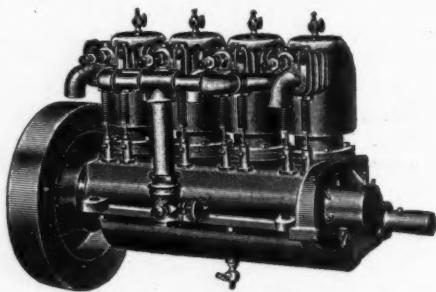
Herbert L. Towle has opened an office at 123 Liberty street, New York, where he will carry on the business of mechanical draughtsman and machine designer with particular reference to the gas engine and automobile business.



Thomas Motor on Running Gear.

THE NEW RUTENBER MOTOR

The Rutenber Mfg. Co., 1104 Temple, Chicago, exhibited at the show for the first time, and while the exhibit was small it formed an important feature of the department devoted to motors. The company has made a specialty of four-cylinder engines and devoted some years to the manufacture of engines of different kinds, the experience so gained being utilized in the production of those now adopted as standard. The illustration shows the small 4-cylinder, air cooled motor which created such favorable comment at the show where it was kept in operation almost constantly. It is compact, powerful and economical, is simple in construction and operation and has less parts than the average motor. It is built on the interchangeable plan, so that in case of accidents or breakage of parts the purchaser will not have to discard or send his entire machine back to the factory, a feature which should appeal to users. The material is of the best, and no engine is allowed to be sent out until it has been tested under a load which will develop its full capacity. The crank shafts are forged from one billet of the best open-



hearth steel, the cranks each being slotted and the parts accurately machined. The shaft is supported by five journals of ample proportions and fitted with the best phosphor bronze bushings. The connecting rods are of forged steel, fitted with interchangeable hardened steel and phosphor bronze bushings, allowance being made for adjustment. The cam shaft is carried inside the crank case, all cams being made of tool steel, and as they are carried practically in an oil bath, the wear is reduced to a minimum. All valves are mechanically operated, and are made from drop forgings, accurately machined. All are of the same size and are easily accessible should it be desired to remove them.

Heavy springs are used to keep the valves seated, and it is claimed that back firing is unknown in the motor. The makers place importance on the feature of operating the intake valves mechanically on account of it allowing a greater charge of gas to be taken into the cylinders than if they were operated by suction, which is true. The valve boxes are so constructed that all valves may be easily removed without disconnecting any pipes or other parts.

The ignition is by jump spark, and in this feature the company has adopted a device for the control of the

motor that is simple, compact and positive to a high degree. No chains, sprockets, gears, cams or other such parts are used, the device being attached to one end of the counter or cam shaft and completely inclosed in a case by which the working parts are protected from dirt. The control of speed is provided by means of one lever which times the ignition in each cylinder to take place exactly at the same point on each stroke, as desired, or varies it according to the requirements of the operator. By this means the motor speeds can be varied from 150 to 1,600 revolutions with little vibration. The latter feature is gained by setting the cranks in such positions that two pistons are going up when the other two are on the downward stroke, thus forming a mechanical balance. One oil cup provides oil lubrication for the entire motor, including cylinders, cam shaft and journals. The flywheel is mounted outside the case and when used for marine purposes the motor is provided with ball thrust bearings, the flywheels being all made to allow for that device.

The company is prepared to furnish motors for all purposes and either water-jacketed or air cooled in the smaller sizes. From a close inspection of the motor at the late show it may be said confidently that the workmanship, construction and design are of a high order. A guarantee is given covering the material and workmanship for 1 year from date of purchase.

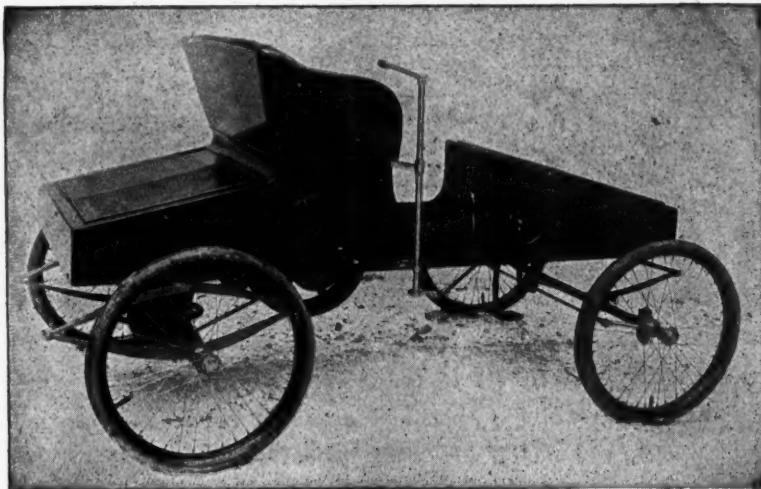
National Vehicle Company's Travelers

The National Vehicle Co. has started out a bunch of traveling men, including Arthur F. Howes, formerly with a prominent manufacturer of electric vehicles in the east. Mr. Howes will cover the eastern territory, with headquarters at Elizabeth, N. J. He will also be in charge of the National exhibit at the Washington show, April 7-12. Another one of the travelers is George M. Dixon, who, during his long connection with the Kokomo Rubber Co., made many friends in the automobile and vehicle trades. Mr. Dickson will cover Ohio, Michigan, part of New York and Pennsylvania. T. C. Whitcomb, another of this company's travelers, is covering considerable western territory. All of the men report excellent business.

Cole Company will Protect its Trade Mark

The G. W. Cole Co., of 141 Broadway, New York, has commenced suit against the American Cement & Oil Co., Excelsior Supply Co., and George T. Robie, all of Chicago, for alleged infringement of its trade mark, "3 in 1," as shown on all its printed matter. The Cole company gives notice to all who may be concerned that it will commence suit against any and all persons who seek to take advantage of the advertising it has done by using a design which may be construed as an infringement of the trade mark referred to. The papers in the suit have already been served but the Cole company deferred mention of the fact until this time in anticipation of some action on the part of the concerns sued to avoid further proceedings.

Two Sizes -- Two Prices



BUFFALO, SR. MODEL NO. 7. PRICE \$800

Is equipped with 6 h. p. medium speed horizontal motor. Reliable transmission. Two speeds and reverse. Single lever control. Ample body and space for luggage. Commodious seat upholstered in leather. Long wheel base. Standard track.

The BUFFALO JR., a light Runabout, has a $3\frac{1}{2}$ i. h. p. motor. We use only **E. R. THOMAS WORLD'S RECORD MOTORS, because THEY ARE THE BEST**

But Only
One Quality.

The Buffalo

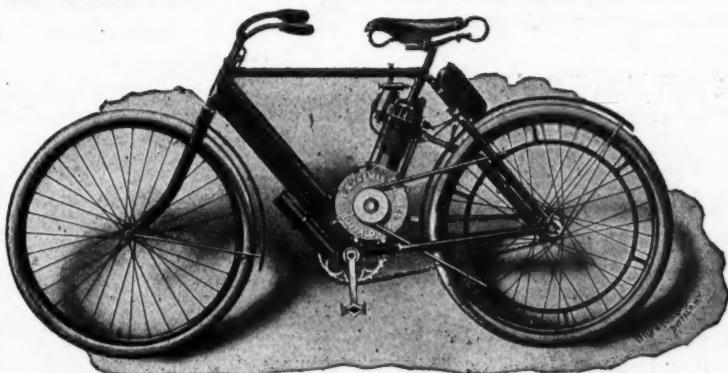
be it Senior at \$800, or Junior at \$650, gives more of everything — except trouble—for the money than any other automobile.

THERE IS ONLY ONE AUTO-BI,

The Original
Thomas Motor Bicycle,
The Pioneer of the Industry

Here is One of Our Three Models
for 1902

Model 3- $1\frac{1}{2}$ i. h. p., belt transmission.....	\$150
Model 4- $2\frac{1}{2}$ i. h. p., belt transmission.....	175
Model 5- $2\frac{1}{2}$ i. h. p., chain transmission.....	200



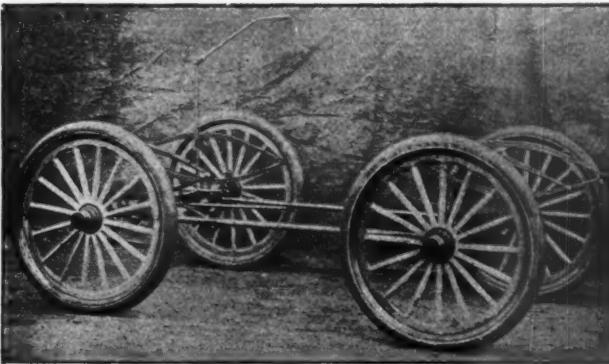
MODEL 4, PRICE \$175

AGENTS: you can have the benefit of our wide experience. We have made and sold enough to convince the most careful buyer that we have passed the experimental stage. We have added every known improvement; exhaust lifts, single grip control for all functions, forged fly wheel, narrow tread, twisted rawhide belt, superior equipment throughout. We are, yours truly,

BUFFALO AUTOMOBILE & AUTO-BI CO.,
BUFFALO, N. Y., U. S. A.

AUTOMOBILE RUNNING GEARS

Get a Running Gear that is Past the Experimental Stage and Build a **SUCCESSFUL AUTOMOBILE**



We Make Two Styles Complete With Springs and Wood Wheels, Solid Rubber or Pneumatic Tires ::

....OUR SPRING BLOCK BEARING IS SELF-ADJUSTING....

and you ought to have it. It is made for revolving axles and is pivoted between the bearing and spring block, enabling the bearing to move free and easy with the axle always. Our catalogue tells all about it.

THE BRECHT AUTOMOBILE CO. ¹²⁰¹ CASS AVE., ST. LOUIS, MO.

HAVE YOU SEEN
The Spaulding Gasoline Runabout?

THE BIG HIT
OF THE
AUTOMOBILE
SHOW

An everyday Automobile for everybody.

Just the thing for pleasure or business.

Most Liberal Terms to Agents.



SIMPLE
DURABLE
ECONOMICAL

200 MILES
ON ONE CHARGE
OF GASOLINE

Spaulding Automobile & Motor Co.
63 Chandler St., Buffalo, N. Y.

STAGE LINES IN ALL DIRECTIONS

A gentleman connected with the Union Pacific railroad sends *MOTOR AGE* information relative to the company's intention to operate a gigantic stage line. He says he believes the company will use steam touring cars or something on the order of a substantial auto-coach using gasoline, similar to those to be used by the same company for travel to Yellowstone Park. The route is to be from the nearest point on its present system to the Thunder Mountain mining district, in Idaho. The company expects to carry 20,000 people into the mining section between May 1 and July 1. The Oregon Short Line is the only railroad reaching anywhere near. It gets no closer than 142 miles, the rest of the journey being by stage, wagon and trail by degrees. It would be impossible even to begin a railroad into the mines by that time, so till the new line can be built the next best accommodations are to be offered.

Houston, Tex.—On the 1st of May a regular automobile service is to be instituted between Houston and Harrisburg over the Harrisburg road. A large wagonette costing in the neighborhood of \$2,500 has been ordered and is already on the way to be put in service. On regular scheduled time the vehicle will travel between the city and its suburb, bearing passengers at a minimum rate. This promises to be the beginning of automobile cab service in Houston.

Council Bluffs, Iowa.—Efforts are being made in South Omaha to organize a company for the purpose of establishing an automobile passenger service between that city and Lake Manawa. The company is endeavoring to secure a subscription of stock of \$30,000. It proposes to purchase six automobiles with a capacity of eighteen passengers each and to establish a 20-minute service between South Omaha and the summer resort, with a 25-cent fare for the round trip.

Lewistown, Mont.—J. R. Cook, of Spokane, has arrived to complete arrangements for putting in an automobile vehicle between here and Harlowton. The vehicle will be running by June 1. It is being constructed in Spokane, will weigh 2,700 pounds and will have 20-horsepower. It will carry twenty passengers in a car that will be drawn behind and the automobile itself will carry their baggage. Mr. Cook is heavily interested in the mines of the North Moccasin district. He said today:

"If the automobile is a success, we will have one for each connection between Lewistown and its railroad points. They will run not only to Harlowton but to Fort Benton and to Great Falls." Much interest is felt here in the venture, which will be the first of its kind in the state.

Nashville, Tenn.—An automobile coach has been completed by J. J. Anderson, the wagon builder. It was built for service between Murfreesboro and Woodbury, a distance of 18 miles. The motive power is steam. The motor was made by a Chicago firm. It is intended that the coach pull a trailer when the traffic requires it. The

combined vehicles will then accommodate twenty-five people, with baggage on the top of the coach. Several tests were made of the coach and everything was found satisfactory. At present the stage makes one trip a day between the points named. It is expected that two trips a day will soon be made, thus giving a fast daily schedule. This is the first automobile service established in this state.

Springfield, Mass.—A proposition has been made to establish an automobile bus line between Court Square and Hampden park. P. J. Casey, of Shea & Co., says that the scheme contemplates the running of 20 automobiles, each with a passenger capacity of 26, the fare to be 10 cents each way. "A great many people," says Mr. Casey, "have never been in an automobile in their lives, and they would get in and pay 10 cents just for the novelty of the thing. Besides, it will make the park much easier to get to. It's a long walk from the street car line now if you want to go to the ball park. The automobiles would take the passengers where they wanted to go, either to the ball park or to the theater or to the chutes at the north end. The automobiles would pay for themselves in a month."

Bordentown, N. J.—Bordentown Mobile and Transportation Co.; object, manufacture electric mobiles; capital, \$50,000; incorporators, Lewis O. Vandergrift, Jesse Smith, Edward K. Minnick, James A. Masterson, James W. Cain, Robert A. Holloway, Edward D. Preston, Frank P. Gray, W. F. Densnap, William C. Steele, James G. Gilbert, George W. Shreeve, Peter J. Magee, David O. Berrian.

Cedarburg, Wis.—Beginning May 1, automobile stages will be running from this city to North Milwaukee, making connections with the electric line to Milwaukee. A stock company has been organized and D. Wittenberg, Jr., J. H. Wittenberg, W. F. Freund and William Roebken left for Chicago to purchase the automobiles. The buses have a seating capacity for a dozen persons each and can make from four to six trips each day. It is likely that Graftin will be made the northern terminus of the route.

Panhards For American Delivery

Either the Panhard people are more eager for American than home trade or Smith & Mavley, their American representatives here, prudently secured big options ahead; but the fact remains that these hustling New Yorkers are delivering the new model, medium power Panhards, mainly 12-h. p., within a month following receipt order, while the poor foreigners now ordering will have to wait from six to nine months for their vehicles. They are showing, also, vehicles fitted with the new hoods now the rage abroad. These hoods have glass fronts. The leather tops cover the seats and tonneau and are fitted with hammock nets overhead for overcoats and luggage.

Dyke's Transmission Device

The illustration shows Dyke's No. A transmission device, direct connected to the engine shaft. It is

enclosed and runs in oil. The engine is of vertical type and is placed in front under a brass cover. Mr. Dyke furnishes the engine, with transmission device, flexible

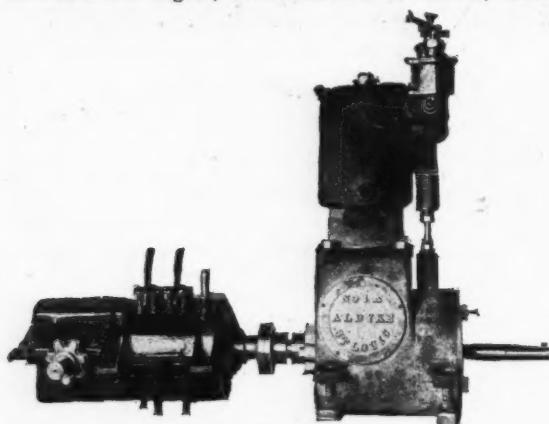


Fig. 1.

reachless running gear, etc., all ready to assemble. Figure 2 shows the style of connecting rod, piston and crank shaft. The latter is drop forged and the connecting rod is of bronze. The piston has three rings, so

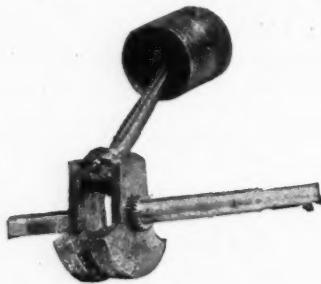


Fig. 2.

placed that the slot cannot work out of place. Mr. Dyke reports that he has sold a number of these outfits, resulting in the satisfaction of the buyers.

Our Exports Exceed Imports

New York, March 24.—Despite the statements relative to the large importation of automobiles, the custom house records show that less than three machines a day arrive in this country from abroad. It is admitted that American manufacturers are exporting a far greater number than are imported. A statement was made today that the presence of foreign carriages in America tended to stimulate the efforts of American manufacturers who would sooner or later produce automobiles that would sell for less money than required for the imported and that would give equal service in every respect. The speaker cited the bicycle trade as an example of America's ability to overcome foreign trade invasions.

During the past two weeks workmen have been busy at the National Vehicle Co.'s plant constructing a quarter-mile testing track, which will be used in giving all National electric vehicles a complete road test before

they are shipped. This test is in addition to the shop test of mechanical parts and the laboratory test of the batteries. The quarter-mile track is located so that the officers of the company may keep the wagons in full view from the office windows during the entire time of the trials.

Motor Age and Cycle Age

MOTOR AGE, with which is incorporated CYCLE AGE, is published every Thursday at rooms 400-409 Monon building, 324 Dearborn street, Chicago, by Samuel A. Miles. It is entered at the Chicago postoffice as second-class matter.

* * * * *

The domestic subscription price is \$2 a year; foreign subscriptions, \$4 a year; single copy, 5 cents. The advertising rates, based on a guaranteed circulation of 5,000 copies, are as follows:

SPACE	One In- sertion	Discounts	7 issues	13 issues	26 issues	52 issues
1 Page...	\$30.00	7 issues 10%	\$27.00	\$25.50	\$22.50	\$20.00
1/2 Page...	18.00	13 " 15%	16.20	15.30	13.50	12.00
1/4 Page...	12.00	26 " 25%	10.80	10.20	9.00	8.00
1/8 Page...	7.50	52 " 33 1/3%	6.75	6.40	5.65	5.00
1 Inch...	4.00	Net rates in following cols	3.60	3.40	3.00	2.65

The circulation of last week's issue was 5,150 copies, 4,590 copies, weighing 1,219 pounds, were mailed, as shown by the postoffice receipt. The remainder were distributed by the Western News Co. and the employes of the paper.

* * * * *

The postoffice receipt for the week, which will enable any one to check the circulation, is as follows:

POSTOFFICE AT CHICAGO, STATE ILL.

Date, March 24, 1902.

Name of publication, MOTOR AGE.
Total subject to postage at one cent per pound.....\$12.18
Received full prepayment of postage.

(Signed) F. E. COYNE, P. M.
By T. M. B.

MISCELLANEOUS

Advertisements under this head 5 cents per word first insertion; 3 cents per word each insertion thereafter. Cash with order. Express orders, postoffice orders or stamps received.

FOR SALE

FOR SALE—The Automobile Storage and Repair Co., 57 West 68th St., New York, have new and second-hand steam, gasoline and electric carriages constantly on hand and have always some special bargains.

FOR SALE—12-h.p., 1902 model, electric ignition Panhard; body by Keillner. S. A. M., care of MOTOR AGE.

FOR SALE—Complete working drawings of a 2 1/4 x 3 1/2-inch air cooled gasoline bicycle motor. Harry L. Ackerly, No. 294 Bay St., Springfield, Mass.

FOR SALE—A two-seated Locomobile in good condition: panel back seats; water glass on tank and other improvements. Will W. Morrison, Bryan, Ohio. 14

FOR SALE—6 horse-power steam engine; leather top; air and gasoline tanks; injector; feed water regulator. 1421 Wesley Ave., Evanston. 13

FOR SALE—Marsh motor cycle; price \$95; photos and further information on application. Chas. Breunig, 412 No. Broadway, St. Louis, Mo. 13

FOR SALE—One new guaranteed 4 horse-power single cylinder gasoline water-cooled automobile or marine motor for \$95; one new guaranteed 7 horse-power automobile or marine motor for \$150. H. L. Hoffman Motor Co., Plainfield, Ill. 14

FOR SALE—Indian curios; 125 pieces, including Pima baskets and pottery. Navajo blankets, beadwork, etc. A. P. Meriwether, M. D., Shipman, Ill. 14

1902
Kelly Adjustable

Handle Bars

STANDARD BARS OF THE WORLD



No. 3 Arms, Regular Stem.



No. 5 Side Arms,
in. Forward Extension.



No. 4 Racing Arms,
2 1/2 in. Forward Extension

It will pay all manufacturers these times when competition is hot, to see that their wheels are equipped with just the attachments demanded by the rider. Every rider knows the merits of KELLY BARS, as they have been for the past six years the most popular and foremost sundry in the cycle trade.

THE KELLY HANDLE BAR CO.
CLEVELAND, OHIO, - - - - - U. S. A.



The same care that enters into the construction of the working parts of a "Toledo" Steam Carriage is observed in building the frame and body.



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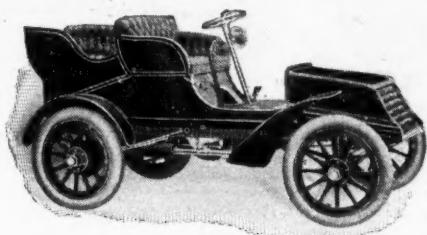
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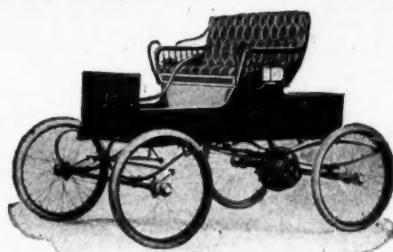
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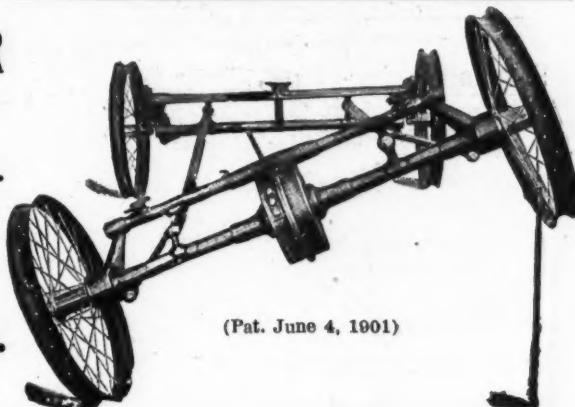
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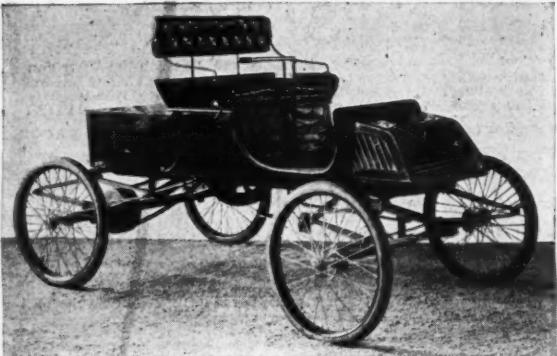
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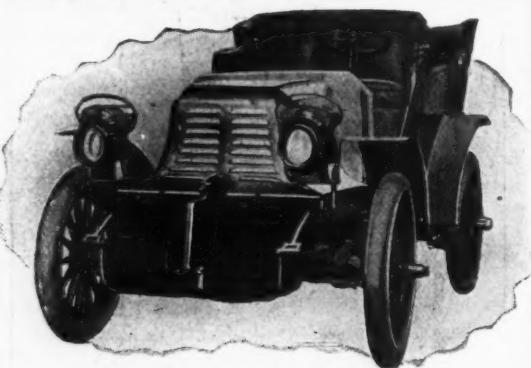
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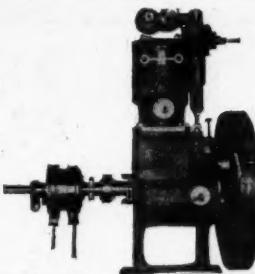
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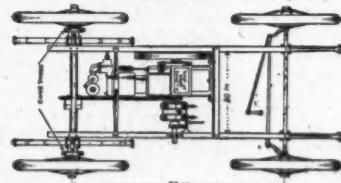
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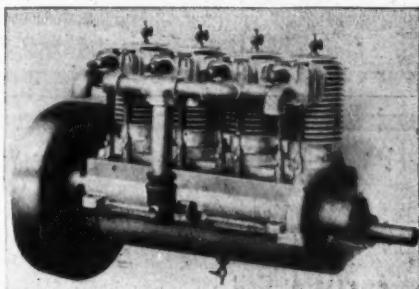
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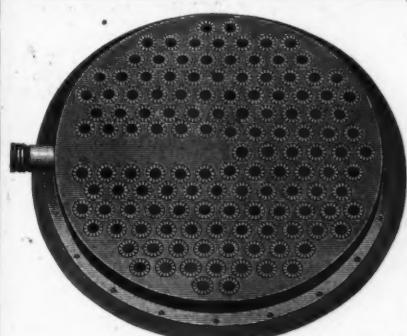
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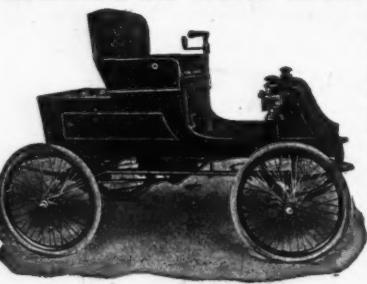
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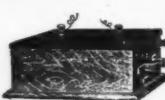
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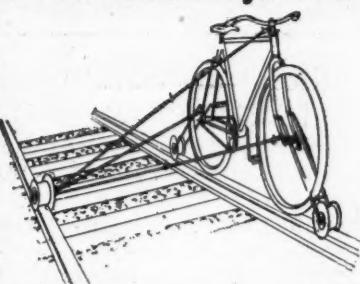
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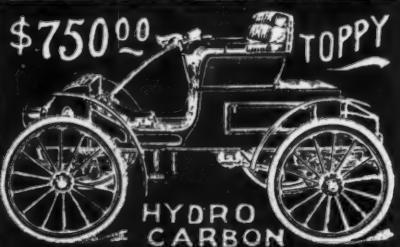
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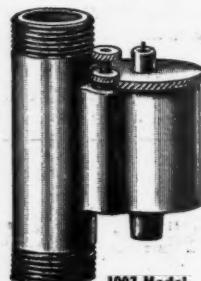
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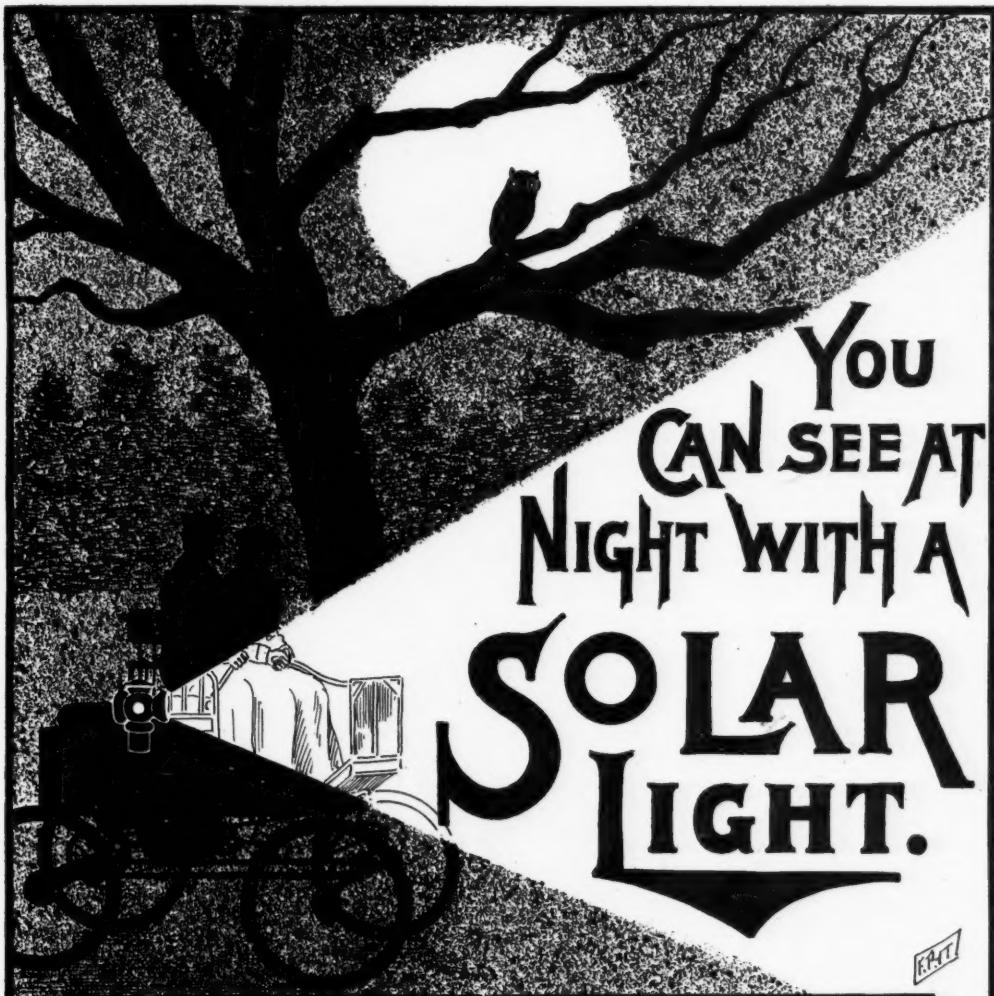
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